

**Professor Roland Duduchava**  
**(on the occasion of 70th Birthday)**



This year marks the 70th birthday of Professor Roland Duduchava, an eminent Georgian mathematician whose contribution to the theory of integral equations of convolution type with discontinuous presymbols is recognized worldwide. He is an author and co-author of 4 monographs and 109 research papers. His results are successfully used by researchers working on singular integral equations, pseudodifferential equations, boundary value problems for elliptic partial differential equations, and on many other problems of mathematics and its applications.

Roland Duduchava was born on November 12, 1945 in Tbilisi. He graduated from a secondary school at Sokhumi in 1962 and enrolled the faculty of Mechanics and Mathematics of Tbilisi State University, from which he graduated with honors in January 1968. He then became a PhD student at A. Razmadze Mathematical Institute of the Georgian Academy of Sciences, Tbilisi, Georgia. In 1971, Roland Duduchava finished his PhD study in Kishinev, Moldova, at the Institute of Mathematics and Computing Center

of the Academy of Sciences of Moldova and in the same year defended his Candidate Thesis (PhD degree) under the supervision of Professor I. Gohberg.

Since 1971, Roland Duduchava had worked as a junior, senior, leading and principal researcher at A. Razmadze Mathematical Institute of the Georgian Academy of Sciences, and since 1995 he headed the Department of Mathematical Physics.

In 1983, he defended his higher doctoral thesis (Habilitation) at the M. Lomonosov Moscow State University. In 1989, he was granted the title of Professor by the Supreme Certifying Commission of the USSR.

At various times, Roland Duduchava worked as a professor at I. Javakhiashvili Tbilisi State University, IB Euro-Caucasian University, Humboldt University in Berlin, Saarland University in Saarbrücken, and Stuttgart University.

Roland Duduchava is a fellow of the Alexander von Humboldt Foundation (1981–1989) and Professor Merkatior of the German Research Council DFG (2001–2002).

He has received 10 international (Soros, AMS, INTAS, DFG and other) and 4 national (GNSF - Shota Rustaveli National Science Foundation) research grants as a head of a research group.

Roland Duduchava is a member of editorial boards of 6 international mathematical journals. He has successfully supervised 7 PhD students and has served as a consultant for one higher doctoral thesis.

He is the president of the Georgian Mathematical Union (since 2009) and the organizer of many international conferences including International Conference “Continuum Mechanics and Related Problems of Analysis” dedicated to the 120-th birthday anniversary of academician N. Muskhelishvili (2011), Caucasian Mathematics Conference (2014), International Workshop on Operator Theory and Applications, IWOTA 2015, and others.

Professor Roland Duduchava is an outstanding scientist, whose life is full of great achievements in mathematics.

We congratulate Roland Duduchava on his birthday and wish him every joy, happiness and great fulfillment in the years to come.

*D. Kapanadze, D. Natroshvili, E. Shargorodsky*

## List of Publications of Roland Duduchava

### (i) Monographs

1. Convolution integral equations with discontinuous presymbols, singular integral equations with fixed singularities, and their applications to problems in mechanics. (Russian) *Trudy Tbiliss. Mat. Inst. Razmadze Akad. Nauk Gruzin. SSR* **60** (1979), 136 pp.
2. Integral equations in convolution with discontinuous presymbols, singular integral equations with fixed singularities, and their applications to some problems of mechanics. With German, French and Russian summaries. Teubner-Texte zur Mathematik. [Teubner Texts on Mathematics] *BSB B. G. Teubner Verlagsgesellschaft, Leipzig*, 1979.
3. Boundary value problems in domains with peaks (with B. Silberman). *Mem. Differential Equations Math. Phys.* **21** (2000), 1–122.
4. Interface crack problems for metallic-piezoelectric composite structures (with T. Buchukuri, O. Chkadua, and D. Natroshvili). *Mem. Differential Equations Math. Phys.* **55** (2012), 1–150;  
<http://rmi.tsu.ge/jeomj/memoirs/vol155/contents.htm>.

### (ii) Papers

1. Singular integral operators in a Hölder space with weight. (Russian) *Dokl. Akad. Nauk SSSR* **191** (1970), 16–19.
2. The boundedness of the singular integration operator in Hölder spaces with weight. (Russian) *Mat. Issled.* **5** (1970), vyp. 1 (15), 56–76.
3. Singular integral equations in Hölder spaces with weight. I. Hölder coefficients. (Russian) *Mat. Issled.* **5** (1970), No. 2(16), 104–124.
4. Singular integral equations in Hölder spaces with weight. II. Partial Hölder coefficients. (Russian) *Mat. Issled.* **5** (1970), No. 3(17), 58–82.
5. The boundary value problem for systems of discrete Wiener–Hopf equations. (Russian) *Mat. Issled.* **7** (1972), No. 2(24), 234–240, 292.
6. Discrete Wiener–Hopf equations that are composed of the Fourier coefficients of piecewise Wiener functions. (Russian) *Dokl. Akad. Nauk SSSR* **207** (1972), 1273–1276; translation in *Sov. Math., Dokl.* **13** (1972), 1903–1907.
7. Discrete Wiener–Hopf equations in  $l_p$  spaces with weight. (Russian) *Sakharth. SSR Mecn. Akad. Moambe* **67** (1972), 17–20.
8. The algebras of singular integral operators in spaces of Hölder functions with weight. (Russian) *Sakharth. SSR Mecn. Akad. Moambe* **65** (1972), 25–28.
9. Wiener–Hopf integral operators with discontinuous symbols. (Russian) *Dokl. Akad. Nauk SSSR* **211** (1973), 277–280; translation in *Sov. Math., Dokl.* **14** (1973), 1001–1005.

10. Algebras of one-dimensional singular integral operators in space of Hölder functions with weight. (Russian) A collection of articles on the theory of functions, 5. *Sakharth. SSR Mecn. Akad. Math. Inst. Shrom.* **43** (1973), 19–52. (errata insert).
11. On Noether theorems for singular integral equations. (Russian) In *Proceedings of Symposium on Mechanics and Related Problems of Analysis*, vol. 1, Metsniereba, Tbilisi, 19–52, 1973.
12. Singular integral operators on piecewise smooth curves. (Russian) *Sakharth. SSR Mecn. Akad. Moambe* **71** (1973), 553–556.
13. Multidimensional convolution equations formed from the Fourier coefficients of discontinuous functions. (Russian) *Sakharth. SSR Mecn. Akad. Moambe* **74** (1974), 277–280.
14. Discrete convolution operators on symmetric spaces of sequences with weights. In *Theses of the Conference of Young Scientists and Post-graduates, I. Javakhishvili State University, I. Vekua Institute of Applied Mathematics*, pp. 63–64, Tbilisi University Press, Tbilisi, 1974.
15. Singular integral equations with unbounded coefficients. (Russian) A collection of articles on the equations of mathematical physics, 4. *Sakharth. SSR Mecn. Akad. Math. Inst. Shrom.* **44** (1974), 72–78.
16. Convolution integral operators with discontinuous coefficients. (Russian) *Dokl. Akad. Nauk SSSR* **218** (1974), 264–267; translation in *Sov. Math., Dokl.* **15** (1975), 1302–1306.
17. Bisingular integral operators and convolution operators in a quadrant. (Russian) *Dokl. Akad. Nauk SSSR* **221** (1975), No. 2, 279–282; translation in *Sov. Math., Dokl.* **16** (1975), 330–334.
18. Wiener–Hopf integral operators. (Russian) *Math. Nachr.* **65** (1975), 59–82.
19. Convolution integral operators with discontinuous symbols. (Russian) Collection of articles on functional analysis, 2. *Sakharth. SSR Mecn. Akad. Math. Inst. Shrom.* **50** (1975), 34–41.
20. The discrete Wiener–Hopf equations. (Russian) Collection of articles on functional analysis, 2. *Sakharth. SSR Mecn. Akad. Math. Inst. Shrom.* **50** (1975), 42–59.
21. Bisingular integral operators, and boundary value problems of the theory of analytic functions in spaces of generalized functions. (Russian) *Dokl. Akad. Nauk SSSR* **224** (1975), No. 5, 996–999; translation in *Sov. Math., Dokl.* **17** (1976), 1324–1328.
22. Integral convolution operators on the quadrant with discontinuous symbols. (Russian) *Izv. Akad. Nauk SSSR Ser. Mat.* **40** (1976), No. 2, 388–412, 470; translation in *Math. USSR, Izv.* **10** (1976), 371–392 (1977).
23. Bisingular integral operators with discontinuous coefficients. (Russian) *Mat. Sb. (N.S.)* **101(143)** (1976), No. 4, 584–609, 640; translation in *Math. USSR, Sb.* **30** (1976), 515–537 (1978).

24. On singular integral operators on piecewise smooth lines. *Function theoretic methods in differential equations*, pp. 109–131. Res. Notes in Math., No. 8, Pitman, London, 1976.
25. A uniqueness theorem for the integral equation of a thin rectangular airfoil (with V. G. Maz'ja). (Russian) *Sakharth. SSR Mecn. Akad. Moambe* **87** (1977), No. 1, 53–56.
26. Integral operators of convolution type with discontinuous coefficients. (Russian) *Math. Nachr.* **79** (1977), 75–98.
27. Discrete convolution operators on the quarter plane, and their indices. (Russian) *Izv. Akad. Nauk SSSR Ser. Mat.* **41** (1977), No. 5, 1125–1137; translation in *Math. USSR, Izv.* **11** (1977), 1072–1084.
28. Singular integral equations with fixed singularities in the kernel on piecewise smooth lines. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **91** (1978), No. 2, 293–296.
29. Some integral equations with singular kernels. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **92** (1978), No. 1, 21–24.
30. Integral equations of convolution type with discontinuous coefficients. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **92** (1978), No. 2, 281–284.
31. On the index of bisingular integral operators. I. (Russian) *Math. Nachr.* **91** (1979), 431–460.
32. On the index of bisingular integral operators. II. (Russian) *Math. Nachr.* **92** (1979), 289–307.
33. Integral equation of convolution type (with B. Khvedelidze). *Mathematical Encyclopaedia* **2**, 598–600, Sovetskaya Entsiklopedia, Moscow, 1979.
34. Solution of a convolution equation on a quadrant. (Russian) *Mat. Zametki* **27** (1980), No. 3, 415–427, 494; translation in *Math. Notes* **27** (1980), 207–213.
35. Integral convolution operators on the half axis with semi-almost-periodic presymbols (with A. I. Saginashvili). (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **98** (1980), No. 1, 21–24.
36. Integral equations of convolution on the half axis with semi-almost-periodic presymbols (with A. I. Saginashvili). (Russian) *Differentsial'nye Uravneniya* **17** (1981), No. 2, 301–312, 389–390; translation in *Differ. Equations* **17** (1981), 207–216.
37. An application of singular integral equations to some problems of elasticity. *Integral Equations Operator Theory* **5** (1982), No. 4, 475–489.
38. Multidimensional singular integral equations. Preliminary theorems. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **109** (1983), No. 2, 241–244.
39. Multidimensional singular integral equations. Fundamental theorems. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **111** (1983), No. 3, 465–468.

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42. On multidimensional singular integral operators. II. The case of compact manifolds. *J. Operator Theory* **11** (1984), No. 2, 199–214.
43. On general singular integral operators of the plane theory of elasticity. *Rend. Sem. Mat. Univ. Politec. Torino* **42** (1984), No. 3, 15–41.
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45. The index of singular integral equations with complex-conjugate functions on piecewise-smooth lines (with T. I. Latsabidze). (Russian) *Trudy Tbiliss. Mat. Inst. Razmadze Akad. Nauk Gruzin. SSR* **76** (1985), 40–59.
46. General singular integral equations and fundamental problems of the plane theory of elasticity. (Russian) *Trudy Tbiliss. Mat. Inst. Razmadze Akad. Nauk Gruzin. SSR* **82** (1986), 45–89.
47. On algebras generated by convolutions and discontinuous functions. Special issue: Wiener–Hopf problems and applications (Oberwolfach, 1986). *Integral Equations Operator Theory* **10** (1987), No. 4, 505–530.
48. The algebra of nonclassical singular integral operators on half space (with R. Schneider). Special issue: Wiener-Hopf problems and applications (Oberwolfach, 1986). *Integral Equations Operator Theory* **10** (1987), No. 4, 531–553.
49. On the regularization of the singular integral operators (with G. Mjzavia). In: *Abstracts of the Conference “Operator Theory, Advances and Applications”*, Calgary, August, 1988.
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51. Basic boundary value problems of the mathematical theory of cracks for anisotropic media (with D. G. Natroshvili and E. M. Shargorodsky). (Russian) *Proc. Extended Seminar I. Vekua Inst. Appl. Math.* **4** (1989), No. 2, 87–90.
52. Boundary value problems of the mathematical theory of cracks (with D. G. Natroshvili and E. M. Shargorodsky). *Tbiliss. Gos. Univ. Inst. Prikl. Mat. Trudy* **39** (1990), 68–84; I. Vekua Institute of Applied Mathematics of Tbilisi State University, *Tbilisi University Press, Tbilisi*, 1990.

53. Some singular integral operators with fixed singularities (with E. M. Shargorodsky). (Russian) *Trudy Tbiliss. Mat. Inst. Razmadze Akad. Nauk Gruzii. SSR* **93** (1990), 3–35.
54. Singular integral operators with complex conjugation on piecewise-smooth lines (with T. I. Latsabidze and A. I. Saginashvili). (Russian) *Soobshch. Akad. Nauk Gruzii* **146** (1992), No. 1, 21–24 (1993).
55. Bessel potential operators for the quarter-plane (with F.-O. Speck). *Appl. Anal.* **45** (1992), No. 1-4, 49–68.
56. Wiener–Hopf equations with the transmission property. *Integral Equations Operator Theory* **15** (1992), No. 3, 412–426.
57. Pseudodifferential operators on compact manifolds with Lipschitz boundary (with F.-O. Speck). *Math. Nachr.* **160** (1993), 149–191.
58. On the norm of singular integral operator on curves with cusps (with N. Krupnik). *Integral Equations Operator Theory* **20** (1994), No. 4, 377–382.
59. Basic boundary value problems of thermoelasticity for anisotropic bodies with cuts (with D. Natroshvili and E. Shargorodsky). I. *Georgian Math. J.* **2** (1995), No. 2, 123–140.
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65. The Wiener–Hopf method for systems of pseudodifferential equations with an application to crack problems (with W. L. Wendland). *Integral Equations Operator Theory* **23** (1995), No. 3, 294–335.
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70. Asymptotics of solutions to some boundary value problems of elasticity for bodies with cuspidal edges (with O. Chkadua). *Mem. Differential Equations Math. Phys.* **15** (1998), 29–58.
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74. Asymptotics of solutions to the crack problem (with O. Chkadua). *Bull. Georgian Acad. Sci.* **159** (1999), No. 3, 389–391.
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85. Mapping properties of the Boltzmann collision operator (with S. Rjasanow). *Integral Equations Operator Theory* **52** (2005), No. 1, 61–84.
86. Finite interval convolution operators with transmission property (with L. P. Castro and F.-O. Speck). *Integral Equations Operator Theory* **52** (2005), No. 2, 165–179.
87. On estimates of the Boltzmann collision operator with cutoff (with R. Kirsch and S. Rjasanow). *J. Math. Fluid Mech.* **8** (2006), No. 2, 242–266.
88. Differential operators and boundary value problems on hypersurfaces (with D. Mitrea and M. Mitrea). *Math. Nachr.* **279** (2006), No. 9–10, 996–1023.
89. Asymmetric factorizations of matrix functions on the real line (with L. P. Castro and F.-O. Speck). *Modern operator theory and applications*, 53–74, Oper. Theory Adv. Appl., 170, Birkhäuser, Basel, 2007.
90. On interaction of electromagnetic waves with infinite bianisotropic layered slab (with T. Buchukuri and L. Sigua). *Math. Nachr.* **280** (2007), No. 9–10, 971–983.
91. Solvability of singular integro-differential equations with multiple complex shifts (with L. P. de Castro and F.-O. Speck). *Complex Anal. Oper. Theory* **2** (2008), No. 2, 327–343.
92. Extended normal vector field and the Weingarten map on hypersurfaces (with D. Kapanadze). *Georgian Math. J.* **15** (2008), No. 3, 485–500.
93. On the uniqueness of a solution to anisotropic Maxwell's equations (with T. Buchukuri, D. Kapanadze, and D. Natroshvili). *Topics in operator theory. Volume 2. Systems and mathematical physics*, 137–164, Oper. Theory Adv. Appl., 203, Birkhäuser Verlag, Basel, 2010.
94. Interface cracks problems in composites with piezoelectric and thermal effects (with T. Buchukuri, O. Chkadua, and D. Natroshvili). *Proceedings of 2009 ASME International Mechanical Engineering Congress, IMECE-2009*, pp. 1–10. Lake Buena Vista, Florida, USA, 2009.
95. Partial differential equations on hypersurfaces. *Mem. Differential Equations Math. Phys.* **48** (2009), 19–74.
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97. A revised asymptotic model of a shell. *Mem. Differential Equations Math. Phys.* **52** (2011), 65–108.
98. Electromagnetic scattering by cylindrical orthotropic waveguide irises (with L. P. Castro and D. Kapanadze). *Georgian Math. J.* **18** (2011), No. 1, 99–120.

99. Continuing functions from a hypersurface with the boundary. *Proc. A. Razmadze Math. Inst.* **155** (2011), 103–109.
100. Extension of functions from hypersurfaces with boundary. *Complex Var. Elliptic Equ.* **57** (2012), No. 6, 625–651.
101. The screen type boundary value problems for anisotropic pseudo-Maxwell's equations (with O. Chkadua and D. Kapanadze). *Proc. A. Razmadze Math. Inst.* **159** (2012), 138–142.
102. Potential methods for anisotropic pseudo-Maxwell equations in screen type problems (with O. Chkadua and D. Kapanadze). *Operator theory, pseudo-differential equations, and mathematical physics*, 73–93, Oper. Theory Adv. Appl., 228, *Birkhäuser/Springer Basel AG, Basel*, 2013.
103. Singular integral operators on an open arc in spaces with weight (with N. Kverghelidze and M. Tsaava). *Integral Equations Operator Theory* **77** (2013), No. 1, 39–56.
104. Localization of a Helmholtz boundary value problem in a domain with piecewise-smooth boundary (with T. Buchukuri, D. Kapanadze, and M. Tsaava). *Proc. A. Razmadze Math. Inst.* **162** (2013), 37–44.
105. Viktor Kupradze 110 (with D. Natroshvili). *Mem. Differ. Equ. Math. Phys.* **60** (2013), 1–14.
106. Mellin convolution operators in Bessel potential spaces with admissible meromorphic kernels. *Mem. Differ. Equ. Math. Phys.* **60** (2013), 135–177.
107. Mixed boundary value problems for the Helmholtz equation in arbitrary 2D-sectors (with M. Tsaava). *Georgian Math. J.* **20** (2013), No. 3, 439–467.
108. Diffraction from polygonal-conical screens, and operator approach (with L. P. Castro and F.-O. Speck). *Operator theory, operator algebras and applications*, 113–137, Oper. Theory Adv. Appl., 242, *Birkhäuser/Springer, Basel*, 2014.
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